

The Marxian Technological-Fix¹

On Capitalist Technological Development & Marx's Ambitions for Production & Consumption under Communism

(1) *Introduction.* G.A. Cohen claims that it is now time for Marxists to junk two traditional articles of their communist faith. The first article centres on a belief in the revolutionary role of the proletariat. This maintains that, at some point in time, a mass of industry-based wage-workers will rise up and revolt against the capitalist mode of production. A dramatic struggle will take place between capitalists and workers and the workers will usher communism into human society via a 'D-day' revolution. The second article of faith centres on a belief about the role of technology in a functioning communist economic order. Here Cohen maintains that Marx believed in the coming of a 'Technological-Fix' in which developments in technology will be so great that a condition of abundance in material goods will become available to human society.

Cohen claims that history has showed Marx's beliefs about class and technology to be ill-founded. Cohen also claims that there is no prospect that such political and economic developments will occur in the future. On the redundancy of the two articles of faith, Cohen writes:

The proletariat did, for a while, grow larger and stronger, but it never became, as the *Communist Manifesto* foretold, the 'immense majority', and it was ultimately reduced and divided by the increasing technical sophistication of the capitalist production process that had been expected to continue to expand its size and augment its power. And the development of productive

¹ I thank Andrew Mason and James Wilson for reading a draft of this paper and the highly useful written comments and suggestions which they provided for me. I also thank Jonathan Wolff for the opportunity to test some of the ideas contained in this paper in discussion with him some years ago.

forces now runs up against a resource barrier. Technical knowledge has not stopped, and will not stop growing, but productive power, which is the capacity (all things considered) to transform nature into use-value – that is, into sources of utility for human beings – cannot expand *pari pasu* with the growth of technical knowledge, because planet Earth rebels: its resources turn out to be not lavish enough for continuous growth in technical knowledge to generate unceasing expansion of use-value.²

Thus, according to Cohen, there is no longer a mass class of workers ready, willing and able to deliver “dramatic” revolutionary change.³ Also, Marx was hopelessly optimistic in his ambitions for technology: there are ecological limits to the goal of material abundance of which he was not aware. For Cohen, both facts show that Marx’s Scientific Socialism is largely, if not wholly, useless as a body of theory which can aid us in the delivery of communism to human society.

My view is that the two articles of faith which Cohen ascribes to Marx, and now uses to reject Marx, have only a slight basis in Marx’s own writings. This paper is primarily about the second article of communist faith and Marx’s *actual* hopes for technology in the transition to, and functioning of, a communist society, although I will have something to say about the nature of labour struggle with capital which Marx developed in his post-*Manifesto* writings on history and economics.

² G.A. Cohen *If You’re An Egalitarian, How Come You’re So Rich?* (Cambridge: Harvard, 2000), p.104.

³ Cohen writes: “...the proletariat did not, and will not, gain the unity and power anticipated for it in Marxist belief. Capitalism does not produce its own gravediggers. The old (partly real, partly imagined) agency of socialist transformation has gone, and there is not, and will never be, another one like it. Socialists have to settle for a less dramatic scenario, and they must engage in more moral advocacy than used to be fashionable.” *If You’re An Egalitarian, How Come You’re So Rich?* (Cambridge: Harvard University Press, 2000), p.112. For my views against Cohen’s rejection of Marx’s scientific socialism and turn towards moral advocacy, see my ‘Against Bringing Marx to Justice *A Marxist Critique of Cohen’s Moralisation of Marx*’ (typescript, 2004).

On the first article of faith, Marx did hold the ‘dramatic’ and ‘D-day’ conception of proletarian revolution, which Cohen attributes to him; however, Marx came to reject this conception of proletarian revolution in his post-*Manifesto* writings on history and economics.⁴ Marx came to believe that worker struggle with capital would be ‘drawn-out’ and that, as Marx states in his *1859 Preface*, social revolution will be progressively secured over an ‘epoch’ rather than a D-day achievement.

On the second article of faith, Marx does not maintain that technology will deliver the kind of abundance which Cohen attributes to him. This is point is the main issue of my talk today. (1) First I will talk about why Marx could not have held the ambition for technology and the dream of abundance which Cohen and others ascribe to him. (2) Then I set out and defend the real ‘Technological-Fix’ that Marx had in mind for the coming of communism. I claim that the Marxian Technological-Fix centres on a tendency towards the replacement of labour by capital factors within the capitalist mode of production, and argue that this tendency is inevitable and desirable for future communism. (3) I conclude by outlining some of the opportunities and a major threat which the Marxian Technological-Fix presents for human society.

(2) *On Marxian Abundance*. Cohen interprets Marx’s hopes for technology as productive growth issuing “in a material abundance so great that anything that anyone needed for a richly fulfilling life could be taken from a common store at no cost to

⁴ The *Manifesto* view of revolutionary social change is premised on: an inevitable immiseration of the proletariat and the claim that, at some point in time, the workers will have ‘nothing to lose but their chains’. The *Manifesto* contains a list of measures at the end of chapter 2, which were meant to be implemented by what was expected to be the imminent seizure of state power by the working classes in the revolutionary period of 1848. However, the 1848 working class uprisings came to nothing, the capitalist state of things continued. In his post-*Manifesto* writings, Marx came to hold an evolutionary view about social change and a view about the piecemeal and progressive improvements that worker movements and socialists can and should effect in human society. Revolutionary movement which takes human society from the dominant hold which the capitalist mode of production has over it towards communist systems of production, distribution and consumption is not sudden or ‘dramatic’ but, instead, occurs over an ‘epoch’ through socialist ‘reformism’. See my ‘Karl Marx’s Scientific Socialism A Defence’ (typescript, 2005) for discussion of this issue.

anyone.”⁵ Jon Elster attributes “the idea that communism would allow for material abundance, in the strict sense that when everyone had taken what they wanted, something would be left over of each and every good” to Marx.⁶ Alec Nove similarly suggests that’s Marx vision for communism consists, in part, in the achievement of systems of production and distribution in goods, which can satisfy any and every consumer want as and when they arise.⁷ Cohen and Elster suggest that Marxists should now dismiss Marx’s hopes of technology delivering circumstances of abundance in wealth to human society as unrealistic.

The following passage from Marx is commonly taken as source for his commitment to such abundance:

In the higher phase of communist society, after the enslaving subordination of the individual to the division of labour,..., after labour has become not only a means to life but life’s prime want; after the productive forces have also increased with the all-round development of the individual, and all the springs of co-operative wealth flow more abundantly – only then can the narrow horizon of bourgeois right be crossed in its entirety and society

⁵ G.A. Cohen *If You’re An Egalitarian, How Come You’re So Rich?* (Cambridge: Harvard University Press, 2000), p.104.

⁶ Jon Elster *Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.526.

⁷ Alec Nove claims that: “Marx appears to believe that technical progress already made under capitalism had fundamentally *solved* the problem of production, but that the shackles imposed on the forces of production by the capitalist system prevented this from being realised in practice... Let us define abundance as a sufficiency to meet requirements at zero price, leaving no reasonable person dissatisfied or seeking more of anything (or at least of anything reproducible). This concept plays a crucial role in Marx’s vision of socialism/communism...” *The Economics of Feasible Socialism* (London: George Allen & Unwin, 1983), p.15. Others also readily accept such assumptions about Marx on abundance, see Will Kymlicka *Liberalism, Community & Culture* (Oxford: Clarendon Press, 1989), p.119ff and Thomas Nagel *Concealment & Exposure & Other Essays* (Oxford: Oxford University Press, 2002), p.110.

inscribe on its banners: from each according to his ability, to each according to his needs!⁸

There is clearly the suggestion of abundance in this statement about communism but does it admit of the ‘utopian’ reading which Cohen, Elster and Nove distil from it?

The first thing to note about this passage is that Marx does not claim that communism will be a circumstance of abundance. He only claims that wealth will flow ‘more abundantly’. Second, Marx puts the problem of alienation in work and the achievement of conditions of meaningful production *before* the prospect of goods flowing more abundantly. (I will say more about this point below.) Third, Marx declares that under communism each must consume in accordance with ‘need’ (not any and every want) in a context where each is able to fully develop and deploy their abilities in society. It is highly implausible to suggest that Marx would accept that the satisfaction of any and every consumer want, as and when they arise, is a proper goal for communism, especially given the course of consumer wants in late capitalist society and the advent of ‘consumerism’.

There are two aspects to the overcoming of scarcity and progression towards abundance of wealth in human society. The first aspect relates to developments in a society’s capacity to produce goods and services for its population. The second aspect relates to the nature of wants that a population presses upon the economy. Progression towards a world in which goods flow ‘more abundantly’ is achieved by increasing productive capacity *and* through a decrease in the amount of material goods that

⁸ Karl Marx *The Critique of the Gotha Programme* in *The First International & After: Political Writings Vol.3* (Harmondsworth: Penguin, 1992), ed. David Fernbach, p.347. See G.A. Cohen’s reference to this passage in his *If You’re An Egalitarian, How Come You’re So Rich?* (Cambridge: Harvard, 2000), p.104.

people demand from the economic system. Movement towards abundance in wealth is achieved through transformations in *both* the ‘objective’ realm of production and the ‘subjective’ realm of human wants.

In their respective accounts of Marx on abundance Cohen and Nove only refer to the objective aspect of abundance and neglect the subjective aspect of abundance.⁹ They both suggest that Marx believed that productive forces can and should develop so that *any* and *every* consumer want will be satisfied under communism. Elster does raise the distinction between what I have termed the objective and subjective aspects of abundance. However, he claims that Marx has little to say about the subjective aspect and a prospective diminution of consumer wants in the transition from capitalism-to-communism. Elster asserts: “Considering Marx’s work as a whole, there is no doubt that he could not rest any hope for abundance on a limitation of human wants.”¹⁰

But if we consider what Marx says about the alienation of the worker in his early writings and the corresponding human drive towards solace in alienating forms of consciousness such as religion, then we can suppose that Marx would hope for an end to the ‘religion’ that we have come to construct and enjoin in late capitalist

⁹ Actually this criticism is not clear cut in the case of Cohen. In his book *If You’re an Egalitarian How Come You’re So Rich?* (Cambridge: Harvard University Press, 2000), p.115, he states “For communism, in which everyone has what she wants,...” Here Cohen takes the nature of human wants for granted and condemns Marx for his utopian expectation that communism will come to satisfy any and every consumer want. However, elsewhere Cohen accepts that a critique of, and hope for reform in, human wants, as they have been shaped by capitalism itself, is a necessary part of the Marxian case for communism. See his *Karl Marx’s Theory of History: A Defence* (Oxford: Oxford University Press, 2000), ch.11. Also on p.307 of this book, Cohen defines abundance as “not an endless flow of goods but a sufficiency produced with a minimum of unpleasant exertion.”

¹⁰ Jon Elster *Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.231. This is a strong and odd claim for Elster to make about Marx especially since Elster cites the following passage from *The German Ideology* elsewhere in his book: “Communist organisation has a two-fold effect on the desires produced in the individual by present day relations; some of these desires – namely desires which exist under all relations, and only change their form and direction under different social relations – are merely altered by the communist social system, for they are given the opportunity to develop normally; but others – namely those originating in a particular society, under particular conditions of [production] and intercourse – are totally deprived of their conditions of existence.” Jon Elster *Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.71.

consumerism. Capitalist commodity consumption has arguably come to function as a modern day 'opiate'.

There is little doubt that Marx would have celebrated some leading features of late capitalist production and consumption, however, there are patterns of capitalist consumption that have troubled Marxists over the course of the twentieth century, and would have troubled Marx had he witnessed that century of social history. Capitalism has obviously proved itself to be a relatively efficient system at delivering useful consumer goods to human society. Both the quantity and quality of goods that the capitalist mode of production has delivered is far superior to that which the Soviet Socialist planned economy attempted to provide for its people. Few would deny that it is good that we have come to enjoy the convenience of, for example, washing machines, computers and refrigerators. Also, products such as disposable nappies, biro and razors are eminently useful for our day-to-day lives. However, what it is of Marxist concern is the sociological phenomenon of consumerism. This phenomenon singles out a trend in which people have come to seek and secure more from the capitalist commodity process than the simple practical value of goods. In short, they are looking for 'meaning' in what they consume. People don't simply look to material goods to help them live their lives but also aim to live life *in* what they consume.

Western consumers have become accustomed to demanding goods which are driven by fashions and fads in food, clothing and furnishings for the home. Yesterday's taste or model becomes discarded for the distractions that are offered by the novelty of the new. To be sure, each of us needs to eat, be clothed and live in comfortably furnished homes. However, we have a consumer culture in which corporate capitalist enterprises such as *Walker's*, *Coca-Cola* & *Nestle* bring interminable innovation and finesse to our appetite for savoury snacks, fizzy drinks

and chocolate. Corporations such as *MacDonald's* are eager to 'super-size' us with their menu options and promotions. There is no doubt that there is comfort (solace?) to be had from the consumption of high fat, high salt and high sugar foodstuffs but there is also the growing problem of obesity which is afflicting populations in late capitalist economies. Given what we know about good nutrition and efficient physiological functioning, less consumption is definitely more.

As regards Western consumption habits in clothing and home furnishings, if the hours of programming on our electronic media and pages in our print media are anything to go by, and the retail trends in clothing and furniture, then it seems that we have become obsessed with 'making over' ourselves by constantly striving to renew both the contents of our wardrobes *and* the wardrobes themselves. A consequence of such obsession is that the West is experiencing ever-increasing levels of material waste due to ever-faster product obsolescence. A cure for this obsession would curb the production of waste, reduce the demands which we make on our industrial and retail systems and lessen the damage that our industry and commerce inflicts on the environment. Again, given what we have come to know about the effects of our industry upon the environment, less consumption is more.

Now I have indicated ways in which over-consumption leads to damage in our bodies and destruction to the earth's eco-system. However, there is a more directly Marxist reason why we should favour a shift away from consumption as a locus for cultural meaning and value in life. This reason stems from Marx's early writings on alienation and the value that he places on people coming to develop, exercise and express their own creative capacities and powers over the course of their life.

Thus, our need for clothing and home furnishings could be addressed in ways which employ more of our own creative capacities or at least a greater use of the skills

of local designers and craftspeople who can manufacture durable goods in accordance to with an appreciation of their practice and one's cultivated taste and character. However, what betrays any pretence of individuality in our consumption habits is the fact that we consume such goods on a fashion and media-led basis. We have come to address our clothing and furnishing needs through the formation and satisfaction of highly capricious wants for the latest *mass*-produced (consumed) clothes and home furnishings produced, marketed and advertised by profit-seeking capitalist corporations such as *Levi's* and *IKEA*. Little of our own creativity or judgment seems to be involved. Herd-mentality seems to dominate our drive consumption habits in clothes and furniture. Capitalist advertising seems geared to urging us to move on from yesterday's model and to 'keep up with the Joneses'.

Marx would have much to criticise about such consumer wants, the commercial system that drives such wants and the industry that produces for such wants.¹¹ Yet Cohen and others assume that unquestioned consumer want-satisfaction should govern what Marxian communists should as part of their ambitions for technology and production under communism. They assume that unquestioned want-satisfaction must determine what counts as worthy use-values. Furthermore, such use-values are assumed to govern what must count as a productive force for communism and, in turn, what communists must take as a hoped for 'development of productive

¹¹ Marx would share the view of William Morris where he writes: "It would be an instructive day's work for any one of us who is strong enough to walk through two or three of the principal streets of London on a week-day, and take accurate note of everything in the shop windows which is embarrassing or superfluous to the daily life of a serious man. Nay, the most of these things no one, serious or un-serious, wants at all; only foolish habit makes even the lightest of minds suppose that he wants them, and to many people even those who buy them they are obvious encumbrances to real work, thought and pleasure. But I beg you to think of the enormous mass of men who are occupied with this miserable trumpery, from the engineers who have had to make the machines for making them, down to the hapless clerks who sit day-long year after year in the horrible dens wherein the wholesale exchange of them is transacted, and the shopmen, who not daring to call their souls their own, retail them amidst numberless insults which they must not resent, to the idle public which doesn't want them but buys them to be bored by them and sick to death of them." 'Art & Socialism' re-printed in A.L. Morton (ed.) *Political Writings of William Morris* (London: Lawrence & Wishart, 1973), p.112.

forces'. But Marxists do call certain consumer wants into question and do not share in the value of productive forces that service such wants. Marx and Marxists don't hope for "continuous growth in technical knowledge [in order] to generate *unceasing* expansion of [commodity] use-value."¹²

As I stated earlier movement towards communism must include transformations in both the objective and subjective aspects of wealth. Communists obviously hope for increases in our capacity to produce material goods in accordance with human wants, but we also hope for that the wants people come to have, and seek to meet, coincide with the human good. The problems of obesity and environmental degradation that I flagged above are examples where the realisation of consumer want-satisfaction and the operation of productive forces lead to damage in the physical well-being of individuals. Such damage should lead us to question and re-shape human wants and our production ambitions in light of our beliefs about the nature of good human functioning, and our knowledge about what is good for our eco-system.

Now, beyond the concern for the flourishing of the physical being, Marxists aim for people to relinquish their reliance upon religion/consumerism and, instead, come to secure meaning and value in their lives through the development, exercise and expression of their creative capacities and powers. Elster himself recognises that "at the centre of Marxism is a specific conception of the good life as one of active self-realisation, rather than passive consumption."¹³ In Marx's early writings, he viewed religion as a symptom of man's alienation. The creation, proliferation and persistence of religious consciousness is explained by Marx in terms of man seeking

¹² See passage from Cohen on p.2 for quote (my emphasis in this citation of Cohen).

¹³ Jon Elster 'Self Realisation in work and politics: the Marxist conception of the good life' in *Alternatives to Capitalism* (Cambridge: Cambridge University Press, 1989), p.127. Also see his *Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.521.

and securing solace in myths, superstitions and fantasy of religion because he is unable to secure meaning in the circumstance of his day-to-day productive life. Humans are not equipped with the wherewithal and opportunities to gain meaning through the development, exercise and expression of their own creative capacities and powers. The shift from religion to consumption as a means to gaining fulfilment can be seen as progress in some sense. In late capitalist consumer society we have come to seek and achieve a *secular* means of meaning and value for their day-to-day lives. According to Marx's vision of communism, the next step would be to achieve a shift from consumption to production as the primary sphere of individual self-realisation. More of our needs and wants must be met through the development, exercise and expression of our own capacities and powers rather than passive commodity consumption. As Marx suggests productive forces must increase *with* 'the all-round development of the individual'.

How can we effect such a change? Apparently,

Two generations ago, Japanese couples did not bother with buying engagement rings. Then the *De Beers* diamond cartel, through an advertising campaign in the 1970s, convinced Japanese women that they deserved a ring just like western women. A new standard was imposed: Japanese men must spend at least two month's salary on a colourless lump of carbon to demonstrate their romantic commitment. Japanese marriages are probably no happier than a generation ago, but *De Beers* is richer.¹⁴

¹⁴ Geoffrey Miller 'Waste is Good' in *Prospect*, February 1999, p.20. For a report on *De Beers*' attempts to "create demand" in China and India, and their attempts to resuscitate the depression-suffering Japanese market, see *The Guardian* 11/08/05, p.20, 'China's brides are a diamond miner's new best friend'.

Now, the need/want at play here is deep in human nature but must it manifest itself in terms of a preference for a 'colourless lump of carbon' and be satisfied through capitalist commodity production and its attendant specialisation and division of labour? Companies such as *De Beers* are in the business of shaping consumer preferences for the sake of profit through their advertising and marketing strategies. Apparently in 1959 the aggregate advertising expenditure of capitalist corporations exceeded the United Kingdom's State budget for education.¹⁵ That is, a greater part of the social product was devoted to the re-production and expansion of capitalist commodity consumption. There is a political choice which we make here. Should we acquiesce to the want-shaping and aspiration-forming marketing activities of capitalist corporations or should we seek to curb what they do with alternative views about how we should live?¹⁶ Capitalist corporations are training people for a certain cultural life that revolves around commodity consumption; a Marxist-inspired State could counter this with alternative kinds of training and education. Marxian Communists want the satisfaction of human needs and wants, and ways of life, to be rooted in the development, exercise and expression of our creative powers. Rather than looking to the capitalist realm of commodity production, market exchange and money, we should look to development, exercise and expression of our generically human capacities.

In the *De Beers* example above, the need is deep - that for a significant act of engagement, a demonstration of love and an expression of commitment. Capitalist corporations have succeeded in making people invest emotion and expectation in the act and ceremony of giving an engagement ring. They mount the systems of production, distribution and retail upon such a custom. Their interest then lies in

¹⁵ Stuart Hall 'The Supply of Demand' in *Out of Apathy* (London: New Left Books, 1960), ed. Norman Birnbaum.

¹⁶ John Rawls *A Theory of Justice* (Oxford: Oxford University Press, 1999 revised edition), p.229.

sustaining and feeding the emotion and expectation invested in their diamonds, through advertising and marketing. We now have a situation in which the giving and receiving of engagement rings is a cultural norm. It is constitutive of the act of engagement. It seems as if you cannot get married without the prior act of engagement in which a diamond ring is passed from the prospective groom to the bride. Expectation and emotion is concentrated on the aesthetics of the ring, its price and its potential to impress a parade of on-lookers.

However, the act of engagement and the need to express one's love and demonstrate one's commitment could be met in other ways. For Marxists such needs are better met through the development, exercise and expression of our generically human powers and capacities rather than through passive consumption. A better way of satisfying such needs could be a ceremony in which the prospective couple compose and recite poems to one another expressing their love and commitment to one another in front of an audience of their friends and family. A poetic performance could come to constitute the act of engagement. This would certainly be more personal than the purchase and giving of a ring, and it would be rooted in the exercise and expression of man's own capacities. One would seek to impress the heart with words rather than the finger with metal and stone. Of course, such a practice presupposes that the capacity to appreciate, write and recite poetry is developed within our systems of education and the inculcation of an aspiration to use poetry in such a way. In absence of such education, or if the respective couple are not fully confident in their own capacities in spite of an education in poetry, then perhaps they could seek the council of a local poet who, like a laureate, would be on hand to help out in such occasions. A local laureate rather than a parish priest would enable couples to form deeper and more meaningful attachments to one another. Moreover, poetry, prose and

song could also be used for secular ceremonies regarding births, marriages and deaths and come to provide a real alternative to our reliance upon religious customs for such occasions.¹⁷

Marx suggests that the drive to religion wanes in the face of increased opportunities to gain meaning and value through the use of one's creative and productive powers. Similarly a Marxian hope, which arises out of the Marx's classic analysis of alienation, is that the central impulses that send mankind to seek solace/satisfaction in passive consumption atrophy through a higher development of our creative human capacities. In the development from capitalism to communism more of our needs must be met through using our own developed powers rather than relying on capitalist commodity production, market exchange and money.

It may be a utopian Marxian hope to expect such a transformation of wants to occur in human society but the content of such utopianism differs from the charge of utopianism which Cohen and others have made. Marx could not have expected that we would progress to a situation in which we develop production technologies to such an extent so that any and every consumer want, as they have developed under capitalism, would be satisfied under communism. Marx was not committed to such an unworthy, unrealistic and utopian goal for technological development. I turn to Marx's actual hopes for technology in the following section.

¹⁷ In the greeting cards industry wage-workers are set to 'mine' their imagination in a similar way to which wage-workers within *De Beers* are set to mine the earth. The comedian Jerry Seinfeld, in a sketch about greeting cards industry, points out the following: 'There is something very insincere about these greetings cards we send back and forth to one another all the time. They are like these \$1 folded paper emotional prostitutes.' It's like we're saying: 'I don't know what my feelings are so I'll just pay some total stranger a buck, to make up this little *Hallmark* hooker to do the job for me.' 'So I can go: "I didn't write this but whatever they wrote, I think the same thing!"' For Marxists, progress would be achieved when both the diamonds and greetings cards industry wither through atrophy in the demand for such goods. Under communism we would learn to satisfy certain needs through the development, exercise and expression of our own powers and capacities rather than in terms of a preference for capitalist commodities.

(3) *The Tendency Towards the Replacement of Labour by Capital in the Capitalist Production Process.* Marx's actual view on the prospects for technology in the production process is contained in the following passage from the *Grundrisse*:

... the degree that large industry develops, the creation of real wealth comes to depend less on labour time and on the amount of labour employed than on the power of agencies set in motion during labour time, whose 'powerful effectiveness' is itself in turn out of all proportion to the direct labour time spent on their production, but depends rather on the general state of science and on the progress of technology, or the application of this science to production. The development of this science, especially natural science, and all others with the latter, is itself in turn related to the development of material production. Agriculture, e.g., becomes merely the application of the science of material metabolism, its regulation for the greatest advantage of the entire body of society. Real wealth manifests itself, rather - and large industry reveals this - in the monstrous disproportion between labour time applied, and its product, as well as in the qualitative imbalance between labour, reduced to pure abstraction, and the power of the production process it superintends. Labour no longer appears so much to be included within the production process; rather the human being comes to relate more as a watchman and regulator to the production process itself. (What holds for machinery holds likewise for the combination of human activities and the development of human intercourse.) No longer does the worker insert a modified natural thing as middle link between the object and himself; rather, he inserts the process of nature, transformed into an industrial process, as a means between himself and

inorganic nature, mastering it. He steps to the side of the production process instead of being its chief actor.¹⁸

The Marxian technological-fix centres on prospects for transformations in the techniques of capitalist production. It relates to a *tendency* towards replacement of labour by capital factors within the capitalist production process and the *goal* of human society achieving capital-intensive systems of production and distribution across the primary (agricultural), secondary (industrial) and tertiary (service) sectors of the capitalist economy. As capitalism develops less and less labour factors are required to deliver the same, or greater, amounts of the capitalist economic product.¹⁹ According to Marx, capitalist development can, will and should deliver circumstances where physical capital rather than human muscle and mental power in the form of wage-labour comes to service the mass mundane material wants of mankind.²⁰ The Marxian technological-fix includes the aim of achieving an economy which has flexible capital-intensive systems of production and distribution in agricultural, industrial and service sector goods, which can readily track and satisfy human wants. As Marx claims, humans ‘step to the side of the production process’. *Capital* rather than the mass deployment of alienating wage-labour will come to produce for mundane material wants in human society.

¹⁸ Karl Marx *Grundrisse* (Harmondsworth: Penguin, 1993), p.705.

¹⁹ Of course, given what I argued in section (2), Marxists seek significant changes in the nature of the products which capitalist systems of production deliver to human society.

²⁰ ‘Mundane’ material wants of society refers to the fact that all modern economies (should) have as their basis the production and consumption of general goods. The primary (agricultural) sector produces general staples such as wheat, rice and milk and processed foods such as bread, puddings and cheese. The secondary (industrial) sector produces goods such as iron, plastic and glass and processed goods such as cars, washing machines and microwaves. The tertiary (service) sector concentrates on the marketing, sale and retail of goods to consumers. In addition, a modern economy should also have an efficient infrastructure which caters to mundane wants for transport, telecommunications and utilities such as water, gas and electricity.

The Marxian Technological-Fix centres on the claim that each sector of the capitalist economy should, can and will become capital-intensive. I will say something about the three aspects of this claim in turn.

(i) *Production should become capital-intensive*. This claim simply follows from the Marxist abhorrence of the alienation caused by routine, menial and mundane wage-labour, and the value that Marxists place on people coming to develop, exercise and express their creative capacities and powers over the course of their lives.

Capitalists introduced an alienating specialisation and division of labour into the production process, in which each worker is paid to perform a simple and repetitive task day in day out because, as Adam Smith famously pointed out in his ‘needle-making’ example in the opening pages of the *Wealth of Nations*, it maximises productivity and minimises the costs of labour. Capitalists found that an assembly line of unskilled workers is far more productive than a workshop of semi-skilled and skilled workers. Capitalists have tended towards making field, factory, office and retail line-work as unskilled as possible, firstly, because it is easier to train workers and, secondly, because it maximises the potential supply of workers able to perform such production. Men, woman and even children can sell their labour power to the capitalist in order to perform mundane tasks within the production process. However, the deskilling of work and the organisation of capitalist production along the lines of a series of simple tasks performed by a legion of wage workers prepared the ground for the possible replacement of labour by capital factors of production. Indeed, in *Capital Vol.1* Marx updates Smith’s point by detailing the extra productivity gained by the introduction of ‘needle-making machines’ and the replacement of labour by capital in this sector.²¹

²¹ Karl Marx *Capital Vol.1* (Harmondsworth: Penguin, 1990), p.588.

For Marxists it is better to have a robot perform mindless assembly-line tasks day-in-day-out, all-night and all year round, than a human. We should be leaving humans to produce in ways which are more worthy of their nature.

(ii) *Production can become (and is becoming) capital-intensive*. To be clear the Marxian Technological-Fix does *not* claim that technology can come to produce for *all* human wants under communism. There is a limit of what robots, machines and computers can do for man. There are forms of production for social needs which are intrinsically labour-intensive, such as the teaching of infants, the performance of surgery upon a patient and the composition (performance) of music for an appreciative audience. Such forms of production necessarily require the development, exercise and expression of particular human powers of creativity, skill and judgement. The use of such powers caters to our less mundane human wants for education, healthcare and culture. Also, human society will benefit by having alienated wage-labourers ‘released’ from their jobs, thus allowing society to concentrate more labour factors in vocational, professional and creative forms of production such as teaching, academic research, medicine, surgery, nursing, painting, poetry and philosophy.²² Robots, machines and computers can, in theory, replace all mindless, stupefying and stultifying tasks that need to be performed in the production process. The Marxian Technological-Fix includes the goal of making that theory a reality. There is a limit to what technology can do for human society, but we should aim for that limit. We should have increasing numbers of people take on more meaningful forms of production, which allow/require them to use their generically human powers in the service of social need.

²² Elsewhere I argue that such forms of production have come to be performed within the public sector and under the auspices of various Associations of Producers and that such production should continue to be conducted on this basis and in accordance with an ethos of ‘public service’. See my paper ‘The Sense In Which Communists Must be Communitarian *Alisdair MacIntyre’s Neo-Aristotelianism & the Concepts of Freedom & Community in Karl Marx’s Philosophy*’ (typescript, 2004).

How far have we progressed towards such goals? In the course of Western capitalism we have already witnessed a displacement of mass labour from the agricultural base of the economy to a growing industrial base, and then from the industrial base to the service sector of the capitalist economy.²³ Such displacement of labour was caused by technological development within the agricultural and industrial sectors. Development in seed, field and harvesting technology has replaced the work of mass labour in agriculture. Developments in plant, robotic and computing technology have replaced the work of mass labour in industry.²⁴ Growth of productive capacity within the primary and secondary sectors of the economy is not achieved by applying significantly more labour factors but by adding capital factors of production.

Jeremy Rifkin (President of the Foundation on Economic Trends in Washington) in his book *The End of Work: The Decline of the Global Labour Force & the Dawn of the Post-Market Era*²⁵ documents trends revealing the progressive exclusion of human labour from all sectors of the economy. He documents the technological changes that have led to mass (structural) unemployment within the agricultural and industrial sectors of the capitalist economy and predicts that

²³ For the OECD Labour Force Statistics illustrating this displacement of human labour see David Harvey's book *The Condition of Postmodernity: An Enquiry into the Origins of Cultural Change* (Oxford: Blackwell, 1990), p.157.

²⁴ For an example of just how far labour can be excluded from the industrial sector see *The Guardian*, Tuesday September 22nd 1998, The Enterprise Page, p.24. They report the following: A Nottingham-based precision engineering company presently employs 27 people in three factories. They preside over the 'latest computer controlled metal cutting machines' which have slashed 'component production times, reduced costs and improved quality of what used to be a semi-to-highly-skilled human activity'. 'The factories are equipped with the latest German and Japanese computer-controlled milling machines and lathes. The milling machines are equipped with expensive precision fixtures that can hold up to six components at a time to speed up production. The lathe's computer controls can dial into the Internet to rent additional functions or to have problems diagnosed remotely by a supplier. All machines are backed up by computer controlled measuring machines to ensure first time quality. One computer programmer has written the computerised production-control package, used by all three factories, to schedule work, track orders and prepare invoices. At present they are designing an Internet page which will aid them in selling production capacity to the US market; all three factories will be linked by e-mail to enable them to swap data. £200000 investment in the latest state-of-the-art Japanese milling machine will replace the equivalent of two and a half (already dated) conventional computer controlled milling machines and will do most of the parts the factory makes in half the time of other machines. Also, the machines fill 1000 sq. ft. and can be left to run for three-to-four hours at a go, making 24 hours *lights-out* manufacturing a distinct possibility'.

²⁵ (Harmondsworth: Penguin, 2000)

developments in information, computing and telecommunications (ICT) technology will cause similar unemployment in presently growing areas of employment in the service sector.

What are the prospects for the replacement of labour by capital in the capitalist service sector? The terms ‘post-Fordist’, ‘post-industrial’ and ‘late’ capitalism serve to signify that we have moved into a situation in which labour factors have become concentrated in the service sector of the economy. The service sector involves the marketing, distribution and retail of goods and services to consumers. Such production has already started to become more capital-intensive. Developments in ICT technology have facilitated the so-called shift from ‘brick-to-click’ across a range of service sector business. Financial services; the sale of tickets for travel, theatre and cinema, and the retail of groceries and household goods are increasingly conducted across computer screens rather than high street counters.²⁶

At present we consume the following mass ‘media’ products: books, journals, newspapers, magazines; compact discs and compact disc players; cassette tape and cassette players; video films and video players; Minidiscs and Minidisc players; and DVDs and DVD players. Mass employment in the media industry trades on the fact that media consumption presently relies upon the production, distribution of *physical* goods (books, cassettes, CDs, etc.). Some years ago it was predicted that the ‘direct digital distribution’ of music, film and text to home computers will devastate

²⁶ This shift has also been facilitated by the increased acceptance and use of ‘virtual’ money and credit. The need for high street banking, insurance or investments services rested on the fact that money was, in the main, a physical quantity. That is, we used to use notes, coins and cheques in order to effect market transactions. Technology is consigning this fact to history. In the future currency will simply become ‘zeroes-and-ones’ coursing through cyber-space adjusting individual and corporate deposits in accordance with digitised transactions.

‘traditional retailers and distributors’ of media products.²⁷ This prediction has been borne out by subsequent commercial events.²⁸

The shift from brick-to-click has been facilitated by the advent of telephone call centres. Call centres form a late capitalist throwback to the mass-manned factory floors of passing industrial society, and the labour-filled feudal fields of our agrarian past. Call-centres have been responsible for the displacement of some employment opportunities within the service sector economy and the dissolution of others. And now, call-centre wage-labour has itself become as vulnerable to technological development as the field and industrial wage-labour of the past. Talking computers are now a reality. Speech-based computer recognition systems have already replaced the employment of human labour within such service sector production. Such service sector production is in the process of becoming capital-intensive.²⁹

There are also trends towards capital-intensive production in the physical and communications infrastructure of late capitalist economies. Commercial plant, offices and retail superstores, as well as residential homes, are increasingly built ‘off-site’ and reduce the need for on-site labour.³⁰ Such facilities can simply be assembled (and disassembled) when and where they are (not) required. Telecommunications and

²⁷ See *Financial Times*, p.5, 12/11/98, article entitled ‘Internet music sales will hit the Big Five’; Paul Taylor’s article ‘Middlemen Deleted as the Word Spreads’ in the *Financial Times*, 27/10/98, p.15; and *The Guardian*, p.21, The Enterprise Page, 17/11/98. Here there is a feature on how the burgeoning low-cost video-on-demand services are set to supplant the traditional video distribution/rental industry.

²⁸ *The Guardian*, 16/06/04, p.3 article entitled ‘Welcome to music’s online future’. This is an article about the launch of *Apple*’s iTunes digital store in the UK, which already has 700000 songs for customers to download legally at 79p each song. Downloads of chart singles have already outstripped the sale of their CD counterparts.

²⁹ In 1998 320000 people worked in call-centres based in the UK. At that time it was predicted that by the 2000 call-centres would employ 480000 people, or 2% of the UK workforce. See the *Financial Times* newspaper, 21/10/98, p.17. However, a year later there were reports of jobs actually being lost to technology in this business. See *Financial Times*, 8/3/99, p.14 and *Financial Times*, 9/8/99, p.9, article entitled ‘IT may replace 40% of call centre jobs’.

³⁰ The *Financial Times*, 8/6/99, p.16, reports on developments in residential and commercial building technology which reduces the need for on-site labour. Pre-fabricated building technology focuses production in the factory rather than at the building site. Such a development ‘reduces costs, improves upon technology and slashes completion times’. The building company *Arup* is developing production facilities, which cost between £3-5 million to set up. These facilities will be equipped with ‘simple tooling and 100 employees able to produce 12 fully equipped houses a day.’

computing have been growth sectors in the late twentieth century. They were described as sunrise rather than sunset industries because of the potential for profit, salaries and wages which they promised for the populations of Western capitalism. And now, developments in technology are leading businesses within these sectors to shed labour factors of production.³¹ Transport systems can become more capital-intensive by using larger ships, planes, trains and buses to carry freight and passengers.

Obviously the technology itself needs to be managed, corrected and developed by people with highly sophisticated 'poly-technical' knowledge and skills. My argument for the Marxian Technological-Fix involves the end of capitalist field, factory, office and retail 'line-work' rather than 'poly-technical' work, which will be required in order to direct capital-intensive systems of production towards the satisfaction of human wants. It is important for my argument that the increase in poly-technical work does not have the effect of keeping the capitalist demand for labour constant or, even worse, increasing the demand for labour in the capitalist mode of production.³²

What seems to speak in favour of my argument for the Marxian Technological-Fix are the actual trends in unemployment and underemployment that have occurred in late capitalist economies. The triad of North America, Japan and Western Europe contain the world's leading capitalist economies. It is now a fact of these advanced capitalist economies that mass employment opportunities have

³¹ For example in 1999 Ericsson, the telecommunications company, announced that they would axe 11000 jobs in their division which produces and installs network systems. This is because in 1997 they used to dispatch 'a crew of engineers and two truckloads of equipment to complete a contract'. 'Within twelve months, advances in technology enabled two engineers to do the same job with equipment loaded into a Volvo'. They then predicted that 'by the end of 1999, an engineer working alone will install switching systems no larger than a suitcase'. See the *Financial Times*, 26/1/99, p.28.

³² Adair Turner (Director-General of the Confederation of British Industry 1995-9) argues that "ICT is almost certain to be a net job destroyer, to be closer in economic impact to improvements in agricultural technology than to the technologies of the car." *Just Capital: The Liberal Economy* (London: MacMillan, 2001), p.67.

disappeared from the primary and secondary sectors of the economy. Structural unemployment in the previously thriving agricultural, mining and industrial sectors of the capitalist economy is now a persistent economic reality. The goal of 'full' employment had disappeared from the political horizon of advanced capitalist economies. Finance ministers have recently reclaimed the goal and have stated that we again enjoy the full employment levels which were commonplace in 1950's/60's capitalism. However, these claims are made upon the basis of highly selective and one-eyed view of (what have become) massaged unemployment statistics.³³

The International Labour Office (ILO) records global unemployment and underemployment at a record level of 1 billion people. Also, over the 1990's, unemployment within the industrialised economies (the G7) rose from 120 million to 150 million.³⁴ The International Monetary Fund (IMF), in the 1999 edition of its *World Economic Outlook* reports the fact that the proportion of the working-age population in employment within the Euro-zone fell from 63% in 1970 to 57% in 1998.³⁵ Such trends are echoed by a study which reveals a dramatic rise in 'structural inactivity' amongst adults of working age, which occurred between 1980 and 1992, in leading European economies.³⁶

³³ See Jeremy Rifkin's book *The End of Work: The Decline of the Global Labour Force & the Dawn of Post-Market Era* (Harmondsworth: Penguin, 2000), p.167 for the effects of technology upon employment in the US. For reports of unemployment in the UK and the extent to which 2.7 million claimants of disability benefits mask the true state of unemployment see *The Guardian*, 22/05/04, p.24, 'Unemployment time bomb is ticking inside list of benefit claimants'. For reports on the state of unemployment in Japan see Gillian Tett, Naoko Nakame and Alexandra Harney's article 'Down & Out in Japan' in the *Financial Times*, p.21, 8/7/99. In the period 1990-99, 'real' unemployment in Japan (that is, the official unemployment rate plus estimated underemployment) soared from 0% to a rate of 16% of the work force.

³⁴ *The Guardian*, p.27, Finance & Economics section, 24/9/98. See *Financial Times*, 25/6/99, p.7, for a report on the OECD's pessimistic employment outlook for Western countries.

³⁵ *Financial Times*, p.28, 16/6/99.

³⁶ Anton Hemerijck 'Prospects for Effective Social Citizenship in an Age of Structural Inactivity', p.134ff, in Colin Crouch, Klaus Eder & Damian Tambini (eds.) *Citizenship, Markets & the State* (Oxford: Oxford University Press, 2001). This study covers the Netherlands, Belgium, Germany, France, Denmark and the United Kingdom.

If the Marxian Technological-Fix is increasingly becoming a reality, what is driving the tendency? I address this question in what follows.

(iii) *Capitalism will become capital-intensive*. The Marxist claim that capitalism will become increasingly capital-intensive rests on a belief in the motivation, power and activity of organised labour within the capitalist mode of production, and the truth of an argument advanced by the economist John Hicks. I will return to the first part of this claim – regarding the force and ambitions of organised labour – in section (4) below. First I will discuss the nature of Hicks' argument. The economist John Hicks maintains that when unions secure improvements in the pay and conditions of labour, this threatens capitalist profit and engenders capitalists to introduce labour-saving technology into the production process and thus cause a tendency towards the replacement of labour by capital to occur. Hicks claims that changes in the relative prices of the factors of production will cause a factor-saving bias to occur in the production process. Thus, if labour costs rise relative to capital costs then capitalists will tend to make production more capital-intensive in order to maximise their profits.³⁷

According to the Hicksean/Marxian view, capitalists will inevitably seek to replace workers by machines when the relative price of the former rises in relation to the latter. Trades Union activism and the policies of Socialist political parties in power have succeeded in improving the pay and conditions of labour. Such Socialist success, however, imposes further costs on, and restricts 'flexibility' for, the hire-and-fire demanding and subsistence-pay-offering capitalist. Such Socialist success has served to up the employment ante for the profit-maximising capitalist. It drives (has

³⁷ John Hicks *Theory of Wages* (London: MacMillan, 1932), p.125.

driven) capitalists to innovate in their methods of production and install capital-intensive systems in order to produce their goods and services for profit.

Such Socialist action has also encouraged the flight of Western financial and physical capital to the economies of Africa, Asia and South America where labour standards are less demanding than the ones fought for and secured in the West. However, the same Socialist tendencies can eventually be expected to take place in the African, Asian and South American economies. First, we can expect the rise and struggle of organised labour in those lands. Second, the costs of labour can be expected to rise through the media exposure of 'exploitative' working practices in these economies and the heightening of 'ethical' consumer consciousness in our late capitalist Western lands. Capital flight might constitute a short-to-medium avoidance of the capitalist turn to technology, however, Hicks' argument holds in the long term. See section (4) for more on this point.

Now the truth of the Hicksean argument, and the role it plays in Marx's economic thought, has come under an important challenge from Jon Elster. Elster claims that Marxist economists, such as Maurice Dobbs and Paul Sweezy, read the Hicksean argument into Marx, however, the textual basis for extracting such an argument from Marx's writings is slender and, in fact, the argument advanced by Hicks is flawed.³⁸ Elster claims that the Hicksean argument is not up to explaining factor bias that has occurred within the primary and secondary sectors of the economy, and cannot serve as a basis for predicting any general tendency towards the replacement of labour factors by capital within the capitalist mode of production.

My view is that we clearly find a proto-Hicksean argument regarding 'labour-saving' factor bias in Marx. I don't see how anyone who has read ch.15 of *Capital*

³⁸ Jon Elster *Explaining Technical Change* (Cambridge: Cambridge University Press, 1983), p.177 and his *Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.151.

Vol. I on 'Machinery & Large Scale and Industry' can fail to come away with thinking that Marx has the Hicksean argument in mind when he analyses the technological developments that had occurred within the capitalist mode of production up to the time he was writing. Indeed, after a lengthy discussion of the effects of the introduction of machinery into the capitalist production process, Marx asserts that "it would be possible to write a whole history of the inventions made since 1830 for the sole purpose of providing capital with weapons against working class revolt."³⁹ Marx presaged what became a classic argument by a leading non-Marxist economist of the twentieth century.

Elster doubts Marx's subscription to the Hicksean Argument, he also maintains that the Hicksean Argument is flawed. It cannot explain technical change that has occurred and cannot serve as a basis for predicting future change. Elster's main objection to the Hicksean Argument centres on the rationality of capitalist agents; the choices they make over the techniques of production and whether or not it can ever be in the capitalist's interest to behave in the way which Hicks details in his argument. Elster claims that the Hicksean Argument does have strong intuitive appeal but that it is based on a logical fallacy. He reasons as follows. First, assume that the price of labour relative to capital is increasing throughout the economy so that all capitalists simultaneously face rising labour costs. If all capitalists adopt labour-saving capital factors then there will be a fall in the aggregate demand for labour. A fall in the demand for labour leads to a fall in wages. Thus, the adoption of labour-saving technology seems to be the collectively rational response to rising wages by capitalists. The problem with this argument, argues Elster, is that the capitalist acts on an individual and not on a collective basis. He states that: "External economies cannot

³⁹ Karl Marx *Capital Vol. I* (Harmondsworth: Penguin, 1990), p.563.

motivate behaviour under perfect competition; to believe that they can is to make a mistake closely related to the fallacy underlying functional explanation.”⁴⁰

Why does Elster assume that the conditions of perfect competition still hold? The economy of perfect competition and price-taking producers which tends towards a general equilibrium (harmony?) flourishes in neo-classical textbooks; however, we live in an epoch of oligopoly capital. The development of capitalism from conditions of perfect competition to imperfect oligopolistic competition occurred because there were economies to be gained through increasing the scale of capitalist enterprise.⁴¹ A history of vertical and horizontal mergers/acquisitions has resulted in the centralisation of financial and physical capital within oligopolistic corporations, which now dominate almost every aspect of capitalist economic life. Typically, in a post-merger/acquisition capitalist enterprise there occurs a shedding of labour factors in order to ‘rationalise’ production and so avoid the duplication of roles/tasks. That constitutes a drive to capital-intensive production. The same, or greater, amounts of consumer demand are met with relatively less labour factors of production.

We are in an epoch of ‘capitalism without capitalists’. The lone capitalist has been shoved to the margins of our economic life. The traditional capitalist functions of risk, innovation and investment are now subject to bureaucratic control and determination by management systems within oligopolistic corporations. Share-optimised managers decide upon choice of products and production techniques. They are minded and pressured to reduce costs and are well-placed to implement technological change. They have the power and will to invest in and install costly labour-saving capital factors of production if they are tested by demands of organised labour. Thus, the tendency towards the centralisation of financial and physical capital

⁴⁰ Jon Elster *Explaining Technical Change* (Cambridge: Cambridge University Press, 1983), p.102.

⁴¹ Karl Marx *Capital Vol.1* (Harmondsworth: Penguin, 1990), ch.25 sect.2.

as embodied in the spread of the modern oligopoly increasingly provides the 'collective' basis for the rational solution - a development of productive forces which issues in the replacement of labour factors by capital factors of production.

Elster claims that if total costs of capitalist production rise, either through rising labour or capital costs, then the capitalist (managers) will seek to reduce costs. However, he will do this by adopting *either* labour-saving *or* capital-saving factors of production. The goal for the capitalist is to reduce costs and restore his level of profit. He can do this by either reducing his wage-costs or his costs of capital. There is no inevitable tendency for the capitalist to automatically adopt labour-saving capital factors in order to restore or improve upon his profit margins.⁴²

Why might the capitalist prefer to install labour-saving rather than capital-saving factors of production? If the *source* of rising costs is labour then it seems more rational to address the source rather than cast about for any means by which to preserve or promote profit levels. Any efficient capitalist must continually be in the business of minimising his costs from any aspect of the production process. If cheaper sources of raw material become available, or if there are cheaper supplies of capital factors, then it is rational for him to change suppliers. The specific problem that he has to address is that of continual increases in real wage as caused by successful union action and socialist political parties in Government forcing through improvements in the pay and conditions of labour. Adopting labour-saving technology is rational if the

⁴² Elster suggests that Marxists tend to overlook tendencies towards capital-saving innovations (*Making Sense of Marx* (Cambridge: Cambridge University Press, 1985), p.153). There is no doubt that capital-saving innovations occur. The efficient profit-maximising capitalist must constantly look to reduce the costs of production from *any* source. However, this does not affect the truth of the Hicksean Argument (see discussion that follows in main text) or my case for the Marxian Technological-Fix. Tendencies towards the adoption of capital-saving factors do not compromise the goal of having humans step 'to the side of the production process instead of being its chief actor'. The introduction of capital-saving innovations will, *ceteris paribus*, increase the *proportion* of costs which go to labour but will not increase the aggregate demand for labour in the economy. Indeed, I suspect that the introduction of capital-saving factors is mostly, if not wholly, accompanied by a reduction in the demand for labour factors. The example given in footnote 33 demonstrates how the employment of capital-saving inventions is also labour-saving.

capitalist is wary of the fact that unless he addresses the source then he will continue to face rising costs through labour struggle via unions and the political system.

Elster does consider this objection to his argument but then states that competition between producers entails that it is never rational for a single firm to introduce labour-saving technology. He argues that if one firm faces an increase in the wage bill due to unions or socialist politics then there is an incentive to innovate and adopt labour-saving technology in the production process. But then this one firm will be aware that all other firms will face the same rise in labour costs and the same decision as to whether they should adopt labour-saving technology in their production processes. If all other firms innovate and introduce labour-saving technology then this will depress real wage in the economy for their workers. The lone individual firm has a temptation to free-ride upon the decisions and actions of other firms. But Elster maintains that all firms face the free-ride option, therefore it is never rational for an individual firm to take the step towards adopting labour-saving capital in the face of rising real wages.⁴³

Elster might concede that we are indeed in an epoch of oligopoly capital but claim that there is *still* competition between corporations. Large-scale bureaucratic corporations negotiate pay and conditions with nationwide Unions of workers. Even if, say, five companies dominate a particular business, Elster's analysis suggests that it is always rational for the lone firm to hold back and let the other four take on the power of the unions by introducing labour-saving capital-intensive systems of production. The fifth firm can simply wait and, in due course, enjoy the benefit of lower labour costs. But each firm has an incentive to be that fifth firm. This

⁴³ Jon Elster *Explaining Technical Change* (Cambridge: Cambridge University Press, 1983), p.104.

constitutes an impediment to any drive by an individual firm towards the implementation of technological change.

However, there are pressures on individual corporations to get ahead of the pack they compete with, and there are substantial benefits which can accrue to those who do strike out and innovate. Corporate managers within oligopolistic companies are pressed to deliver quarterly reports and yearly returns to their shareholders. Such pressure drives corporate rationality and dictates a turn to technology. Also, we know from our experience of oligopoly markets that there are firms who are more fearless than the rest and who take on the role as leaders. These companies lead innovation in both products for consumers and/or the processes of production that deliver those goods to market. Such innovation enables the leading firm to command temporary ‘monopoly’ rents before the other firms follow and adopt their techniques of production and/or offer close substitute consumer goods. Thus, for example, in 1986 when Rupert Murdoch’s *News International* removed his British newspapers from their traditional home in Fleet Street to labour-saving high-tech facilities in London’s Docklands, he led what became an exodus of newspaper titles from a street in which unions had a stranglehold upon working practices of the UK newsprint business. By 1988 all of the UK’s national newspapers had left Fleet Street for high-tech facilities elsewhere.

(4) *Conclusion*. In his ‘Letter to Annenkov’ Marx cites several reasons for capitalists employing technology in the production process. First, in the early days of the capitalist mode of production, capitalists turned to machines in response to increasing consumer demand. Workers alone, or with modest capital factors to hand, could not keep up with market demand. Twinning labour with machinery just made workers

more productive and enabled the capitalist to better service the wants of his customers. Second, capitalists turned to machines because of the scarcity of labour. In certain sectors there were simply not enough 'hands' to perform the tasks required to meet customer orders.⁴⁴ Third, capitalists introduced machines as a response to the problem of labour struggle. As the capitalist mode of production evolved and the proletariat gained in numbers, strength and consciousness they presented capitalists with new obstacles to their goal of profit-maximisation. Marx writes: "Since 1825, the invention and application of machinery has been simply the result of the war between workers and employers."⁴⁵ The Hicksean Argument came to be true, in part, because of the newly found power, consciousness and ambition of organised labour.

Now there is an issue about the nature of contemporary working class struggle which Cohen highlights. We have witnessed a decline of trade union power and the end of traditional class-based political activism in the West. However, the history and tradition of Trades Union, Social Democratic and Socialist activism has shaped *feelings* of resistance against the right and rule of private capital in late capitalist society. There are now deep anti-free-market-capitalist sentiments which prevail within the populations of late capitalist societies, which seem to be more powerful and enduring than the union and political structures which helped shape them. For example, in March 2006 the Conservative French Government attempted to introduce a law which would give employers greater freedom to fire young 'first time'

⁴⁴ The absence of 'willing' hands drives the adoption of technology today. Thus: 'When Philip Lynch looked at expanding his company's specialist bakery in South Dublin he had a choice. He could either invest €20m (\$19.8m) in a French-made, fully automated, continuous mixing and moulding production line, or save money by keeping to an older but more labour-intensive technology. It was the labour issue which clinched it. "People [here] just don't want to work in baking anymore," says Mr. Lynch, chief executive of IAWS, the Irish Food Group. Nearby, two young Libyan men in white hairnets stand over a conveyor belt as French loaves roll off the state-of-the-art equipment'. *Financial Times*, 10/2/00, p.9.

⁴⁵ Karl Marx 'Letter to Annenkov' in Karl Marx & Frederick Engels *Selected Correspondence* (Moscow: Foreign Languages Publishing House, 1953), p.43. Note that Marx revised the date of the beginning the capitalist response to labour struggle by technology to 1830 in *Capital Vol.1* (see footnote 42 for reference).

workers. France has the lowest rate of Union membership of the leading industrial nations and yet millions of people took to the streets in opposition to this law. The French Government backed down and pulled the law from their statute books.⁴⁶

Such sentiments provoke backlashes in Western economies; they also drive Western movements against worker ‘exploitation’ in developing economies and arguments for ‘fairtrade’ and Western labour standards in all parts of the world.

Now, for Marx and Marxists the Hicksean Argument plays an important role in explaining and understanding the changes in production techniques that we have witnessed. However, Hicks’ argument also serves as a *guide* to socialist action and communist aspiration for human society. Marx did not only believe that capitalists could and would turn to technology in the face of the demands of organised labour, he *urged* workers to use their power and to struggle with capitalists in order to force that turn and tend the economic base of society towards capital-intensive production. Marx exhorted workers to struggle against capital in the belief that such struggle to drive a desirable course of technological development. Ultimately, Marx believed that working class struggle would contribute to developments which would deliver human society from the need for alienating wage-labour. He advised working class movements to look beyond their ‘local’ victories for better pay and conditions within the capitalist mode of production and to keep a greater historical and epoch-shifting prize in mind. In Marx’s 1865 address to the General Council of the First International, he states:

At the same time, and quite apart from the general servitude involved
in the wages system, the working class ought not to exaggerate to themselves

⁴⁶ See report in *The Economist*, April 29th – May 5th 2006, p.42. France has 8% of their working population as members of a union. This contrasts with the US at 12%; Germany at 23% and the UK at 30%.

the ultimate working of these everyday struggles. They ought not to forget that they are fighting with effects, but not with causes of those effects; that they are retarding the downward movement, but not changing its direction; that they are applying palliatives, not curing the malady. They ought, therefore, not to be exclusively absorbed in these unavoidable guerrilla fights incessantly springing up from the never-ceasing encroachments of capital or changes of the market. They ought to understand that, with all the miseries it imposes upon them, the present system simultaneously engenders the *material conditions* and *social forms* necessary for the economical reconstruction of society. Instead of the *conservative* motto, '*A fair day's wage for a fair day's work!*' they ought to inscribe on their banner the revolutionary watchword, '*Abolition of the wages system!*'⁴⁷

Indeed, the end of alienating wage-labour is the historical goal which communists seek. Or, if wage-labour cannot disappear altogether then, at least, it should be pushed to the margins of our economic life, and the margins of any individual's life. 'The economical reconstruction of society' that Marx and Marxists seek includes the advent of capital-intensive production. Technology should help us free people from such toil and enable them to be free to gain meaning, value and self-realisation in their lives through the development, exercise and expression of their creative capacities. In addition to technological changes in the 'objective' aspect of the production of wealth, I have also argued that we should seek changes in the 'subjective' aspect of wealth. That is, we should aim to regulate and curb the advertising activities of corporate capitalist commodity production and counter the

⁴⁷ Karl Marx *Value, Price & Profit*, p.215, re-printed in Karl Marx & Frederick Engels *Selected Works in One Volume* (Progress Publishers: Moscow & Lawrence & Wishart: London, 1991 revised edition).

excesses of our passive consumer culture by educating for alternative ways of life rooted in the development, exercise and expression of our own powers.

A capital-intensive economic base is essential for Marxian communism. Class struggle, and the capitalist response to class struggle, has driven human society towards this goal. Part of my aim in this paper is to bring the forces which are driving, and which can further drive, human society to such a state into view. Another part of my aim in setting out the case for the Marxian Technological-Fix is for its ambitions to be accepted more widely so that movements towards the goal of capital-intensive production, distribution and retail of wealth will be *accelerated*.

There are tendencies which slow the speed of the delivery of the Marxian Technological-Fix to human society. First, Neo-conservative parties and politicians can and do react to the victories secured by organised labour by seeking to reverse the protections, standards and minimum returns that workers have come to expect from the sale of their labour power to capitalist organisations. Second, Capitalists can and do address the address the problem of labour in mature capitalist economies by taking their financial and physical capital to early, developing and transitional capitalist economies. There they can and do find workers who have far more modest demands for the sale of their labour power to capitalists. Third, Governments of such economies wrest a tendency towards the replacement of labour by capital by insisting that capitalist corporations provide certain number of (wage-labour) jobs for their population in return for a licence to produce on their territory. In the face of these counteracting tendencies the job of socialists is to resist the ambitions of neo-conservatives in the West and to take the socialist fight for labour standards to every corner of the globe.

The Marxian Technological-Fix presents many opportunities for us. It also presents a major economic threat which we cannot ignore. Alongside the necessary socialist struggle for a capital-intensive future, there is a need to develop and sustain social, political and philosophical forms necessary for a communist reconstruction of society. I believe that the acceptance of the normative ambitions contained in the Marxian Technological-Fix has deep implications for the political choices that should be made regarding industrial policy and our ambitions for the education of a population. We can and should be preparing and motivating people to lead lives of 'productive' leisure.⁴⁸ The advent of the Marxian Technological-Fix provides us with opportunities to: expand of public sector/service production; reduce the 'formal' working week and introduce radical socialist changes in the terms by which we enable people to consume from the economic product.

As regards consumption of the economic product, if we are in the process of leaving an economy dominated by capitalist wage-labour then we must increasingly turn to schemes of conditional income (the receipt of which is contingent on a person being in a certain kind of need and/or their ability to perform some aspect of public sector/service production for social need) and an unconditional basic income scheme paid to all regardless of their particular consumption needs or their ability to labour. In the face of the Marxian Technological-Fix, the sale of one's labour power for a wage to the profit-maximising interests of capitalist enterprise must cease to be the principle means by which a population is expected to access the means of consumption.

⁴⁸ Here I mean 'productive' in a very wide sense. It includes creativity, energy and effort directed towards the making and sustaining of personal relations with others, as well as engagement in, and the production of achievement in, the artistic, literary, poetic, intellectual, sporting, recreational and craft-based practices within a society.

Elsewhere I argue that the tendency towards the replacement of labour by capital within the capitalist mode of production forces a *contradiction* on the economics of human society, and a threat to our ability to consume from the potential capitalist product. Economic growth and development currently centres on prospects for wage-labour. On the one hand we presently maintain that wage gained by the sale of one's labour power to the profit-maximising interests of private capital must be the primary means by which people should access the means of consumption. On the other hand, the profit-maximising interests of capitalist enterprise are in the process of driving mass wage-labour out of the production process. Capitalist technological development causes a problem of underconsumption. Earlier I claimed that Marx presaged Hicks' classic argument concerning choice of techniques in the capitalist mode of production. I also believe that Marx advances what amounts to a proto-Keynesian argument concerning a problem of underconsumption which stems from a tendency towards the replacement of labour by capital in the capitalist production process. This tendency diminishes 'effective' demand in mature capitalist economies and restricts effective demand for realisable consumption in early, transitional and developing capitalist economies. Capitalist technological development issues in a sub-optimal realisation of consumer wants. Thus, deep structural changes in our systems of production must be matched by revolutionary transformations in the terms of human consumption.

I believe that extensions to conditional income schemes and the introduction of an unconditional income scheme are increasingly going to prove themselves to be necessary because of the problem of underconsumption. However, from a Marxist point of view, they are also desirable because such schemes will further speed human society to an increasingly capital-intensive future. The availability of non-market

opportunities for income diminishes the compulsion towards alienating capitalist wage-labour. Such schemes diminish the number of willing hands for menial and mundane wage-work and further force the capitalist turn to technology.⁴⁹

⁴⁹ See footnote 47 for an example of a trend which the spread of non-market schemes of income can and should encourage in the capitalist mode of production.